MATHEMATICS

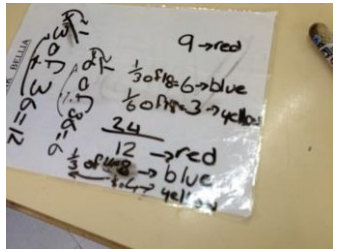
a revised Syllabus for Primary Schools











primary Mathematics support team

June 20114

THE REVISED SYLLABUS

A: NUMBERS, NUMBER PATTERNS AND PLACE VALUE

Place value is significant due to the fact that it helps you understand the meaning of a number. Thus, we can say that understanding of place value is central to developing number sense. It is also the basis for the four fundamental operations on numbers. Consequently, place value connects to many other important concepts.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
A.6.1	round number to the nearest tenth, whole, 10, 100, 1000.	one…..million thousand (Th) Hundreds (H) Tens (T) Units (U) rounding rounding up/down Nearest ten/hundred/thousand nearest whole number nearest tenth digit digit total decimal point decimal number number line square numbers triangular numbers sequence estimate odd/even	• using place value to multiply/divide by 10/100/1000. • using a number line to identify the nearest ten, hundred or thousand to a number, or the nearest tenth or whole number to a decimal number. • using interlocking cubes, base ten material and coins. • recognising the need for zeros to demonstrate the absence of tenths and hundredths. Help by using a place value grid and sliding number cards. • investigating the total of two numbers when both are even, both are odd and when one is even and one is odd. • working with sequences to better understand that a sequence is a string of numbers made by counting in steps for equal size/pattern. • sequencing square numbers: 1, 4, 9, 16, 25, …… • sequencing triangular numbers to better understand that the sequence of triangular numbers is made by adding a number 1 more than the last time. • making and investigating general statements about familiar numbers. • playing Sudoku and other number puzzles. • creating number games. • solving mathematical problems or puzzles, recognising and explaining patterns and relationships, generalising, predicting and suggesting extensions. • making and investigating a general statement about familiar numbers by finding examples that satisfy it.
A.6.2	count on in steps of 0·1, 0·2, 0·25, 0·5… and then back.		
A.6.3	explore and understand triangular numbers.		
A.6.4	recognise and extend number sequences, such as the sequence of square number and the sequence of triangular numbers and predict the next few terms.		
A.6.5	compare and order numbers less than 1 million. Include symbols such as <, >, =.		
A.6.6	give one or more numbers lying between two given numbers.		
A.6.7	make and justify estimates of large numbers including proportion.		
A.6.8	rehearse properties of sums/differences of odd and even numbers and recognise the properties of the products.		

B: ADDITION AND SUBTRACTION

Addition and subtraction are basic operations in mathematics and are inversely related. These are powerful foundational concepts in mathematics with applications to many problem situations and connections to many other topics. Undoubtedly, their importance extends to real-life situations.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
B.6.1	recognise what must be added to a decimal number to make the next whole number		• applying several mental addition and subtraction strategies. • reasoning and selecting an appropriate operation and strategy when solving a problem. • verifying the result of a calculation by using an equivalent calculation, an inverse operation or an inverse order. • doing investigative work involving solutions to non-routine problems. These activities are essential to enable children to develop problem solving skills and to link together all the strands in the syllabus. • solve real-life problems and checking solutions. • using different strategies when solving problems such as: ⊕ looking for important words in a question. ⊕ looking for a pattern. ⊕ trial and error. ⊕ using tables or charts. ⊕ drawing. ⊕ working backwards. ⊕ trying an easier problem. ⊕ making models by using paper, blocks, … • thinking logically for example getting rid of the answer/s that does/do not make sense. • exploring mathematical patterns, particularly using addition and subtraction.
B.6.2	select and use an appropriate operation and strategy when solving a problem		
B.6.3	rehearse adding/ subtracting ThHTU ± ThHTU using informal and standard written methods		
B.6.4	check the result of a calculation and/or real life problem by using an equivalent calculation, an inverse operation or an inverse order		
B.6.5	extend written methods to column addition and subtraction of numbers involving decimals.		
B.6.6	explore mathematical patterns, particularly using addition and subtraction.		

B.6.7	relate mathematical patterns to arithmetical facts and operations.		
B.6.8	**use Mental strategies from previous years, including:**		
i	working out a difference by counting up.		
ii	adding or subtracting the nearest multiple of 10, 100 or 1000, then adjusting.		
iii	using the relationship between addition and subtraction.		
iv	adding several numbers.		
v	using known number facts and place-value to consolidate mental addition/subtraction.		

C: MULTIPLICATON AND DIVISION

Multiplication and division are also basic operations in mathematics and are inversely related. These are powerful foundational concepts in mathematics with applications to many problem situations and connections to many other topics. Undoubtedly, their importance extends to real-life situations.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
C.6.1	consolidate the understanding and the usage of the four operations and the principles (not the names) of the arithmetic laws including the use of brackets.	multiplication fact division fact multiplication multiply division divide by double/doubling half/halving multiple calculation estimate rounding round up/down fraction multiplication square remainder brackets rectangle units/tens tenths/hundredths decimal point decimal numbers product quotient	• using multiplication grid for factors. • using place value cards and mats to multiply and divide by 10/100. • multiplying by zero knowing and exploring pattern : multiplying any number by zero make zero. • rounding up or down after division, depending on the context. • checking results of calculations with inverse operation, and/or equivalent calculation. • recognising that multiplying/dividing by 100 is equivalent to multiplying/dividing by 10 then 10 again. • using doubling and halving to help multiply. • estimating, before multiplying. • exploring any/all of the calculation strategies below: ***Example 20*** 680 ÷ 3 200 2 2 6 r 2 3)6 8 0 −6 0 0 — 200 × 3 — Do we have a hundred threes in 680? Yes. Do we have two hundred threes in 680? Yes. 8 0 − 6 0 — 20 × 3 — Do we have ten threes in 80? Yes. Are there twenty threes? Yes. 2 0 − 1 8 — 6 × 3 — How many threes in 20? 2 — 226 × 3 ∴ 680 ÷ 3 = 226 r 2
C.6.2	use written methods for: • ThHTU × U • HTU × TU • U.t × U • HU·t × U • U·th × U • TU ÷ U • HTU ÷ U • HTU ÷ TU • U.t ÷ U • U·th ÷ U • multiplication and division by 10/100 including decimals (shifting the digits one/two places to the right/left)		

C.6.3	multiply by near multiples of 10 and 100 e.g. to multiply by 49 or 51, multiplying by 50 and adjusting.		***Example 21***
C.6.4	identify remainders after division and express a quotient as a fraction, or as a decimal up to two decimal places.		
C.6.5	identify common multiples of 2 or 3 numbers and the smallest common multiples of 2 or 3 numbers.		
C.6.6	**derive quickly**: • multiplication/division facts up to 10 × 10 and the corresponding halves. • squares of multiples of 10 to 100 and the corresponding halves. • doubles of decimal numbers and the corresponding halves. • doubles of multiples of 10 to 10,000 and the corresponding halves.		

956 ÷ 32

30

```
        2 9  r 28
32 ) 9 5 6
   – 6 4 0        20 × 32   Are there ten thirty-twos in 956? Yes.
     3 1 6                  Are there twenty thirty-twos in 956? Yes.
   – 2 8 8        9 × 32    How many thirty-twos in 316?
     2 8
```

∴ 956 ÷ 32 = 29 r28

Example 22

123·41 ÷ 7

2 0

```
        1 7 · 6 3
7 ) 1 2 3 · 4 1
  – 7 0 · 0 0      10 0  × 7   Start by subtracting tens of seven.
    5 3 · 4 1
  – 4 9 · 0 0       7 0  × 7   Then subtracting units of seven.
    4 · 4 1
  –   4 · 2 0       0 6  × 7   Next subtracting tenths of seven.
    0 · 2 1
  –   0 · 2 1       0 03 × 7   Finally subtracting hundredths of seven.
    0 · 0 0        17 63 × 7
```

C.6.7	**use the following Mental Strategies:**		
i	using the relationship between multiplication and division.		
ii	relating multiplication/division facts and doubling or halving to: • double or halve the most significant digit first. • multiply by 25, multiply by 100 then divide by 4. • double one number and halve the other.		
iii	using factors and/or partitioning. e.g. • $35 \times 18 = 35 \times 6 \times 3$ • $87 \times 6 = (80 \times 6) + (7 \times 6)$ • $3{\cdot}4 \times 3 = (3 \times 3) + (0{\cdot}4 \times 3)$		
iv	using closely related facts such as multiplying by 49 or 51 by multiplying by 50 and adjusting.		

D: FRACTIONS, DECIMALS, PERCENTAGES AND PROPORTION

Fractions, percentages, decimals and proportion are closely related. A fraction is any part of a group, number or whole. A decimal is a number containing both an integer part and digits separated by the decimal point, while a percentage is a quantity out of 100. Proportion is a comprehensive concept and it is imbedded in fractions, percentages and decimals.

In everyday situations, we continuously move from one form to another and then back again. Despite their strong relationship we must also know when we need to use one form among the others.

A good grasp of fractions, decimals, percentages and proportion will help you: evaluate offers, calculate fuel consumption, read a recipe, build a scale model of a car or of an aeroplane and understand a news item or the results from a survey for example.

The above is only a basic representation of the importance of fractions, decimals, percentages and proportion. Helping our children understand and appreciate this may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
D.6.1	reduce a fraction to its simplest form by cancelling common factors in the numerator and denominator.	fraction common factor half third quarte r fifth sixth eighth tenth	• using a fraction as an 'operator' to find fractions, including tenths and hundredths, of numbers or quantities. • understanding that the simplest fraction is the one that cannot be reduced (divided) any further. • reducing a fraction to its simplest form by dividing the top and bottom by the largest possible common factor. • ordering fractions with the same denominator. • knowing that a mixed number is part whole number and part fraction. • understanding that an improper fraction is one whose numerator is greater than the denominator. • converting an improper fraction into a mixed number. • converting a mixed number into an improper fraction. • understanding what each digit in a number (with up to three decimal places) represents. • converting a fraction into a decimal.
D.6.2	order fractions by converting them to fractions with a common denominator, and position them on a number line.		
D.6.3	rehearse converting a mixed fraction into an improper fraction and vice versa.		
D.6.4	use decimal notation for tenths and hundredths in calculations, and tenths, hundredths and thousandths when recording measurements.		

D.6.5	to solve simple problems involving proportion.	equivalent fraction simplest form reduce numerator denominator improper fraction mixed number hundredths thousandths order largest smallest percentage proportion lowest term	• understanding that 3·42 lies between 3·4 and 3·5 (by extending this idea they realise that there is an infinite number of decimal fractions between 3·4 and 3·5). • ordering a mixed set of numbers or measurements with up to three decimal places. • rounding a number with two decimal places to the nearest tenth or to the nearest whole number. • recognising the equivalence between the decimal and fraction forms of one half, one quarter, three quarters, one eighth … and tenths, hundredths and thousandths. • recalling simple fractions as percentages such as: $\frac{1}{2}$ = 50%, $\frac{1}{4}$ = 25%, $\frac{3}{4}$ = 75%. • knowing that a proportion is a part of a whole and can be expressed in different ways, e.g. 4 parts out of a whole 5 parts can be expressed as 4 in 5, 4 out of 5, $\frac{4}{5}$. • understanding that a proportion can be simplified in the same way as a fraction, e.g. a proportion of 6 out of 8 can be simplified as 3 out of 4.
D.6.6	understand percentage as the number of parts in every 100.		
D.6.7	express simple fractions such as one half, one quarter, three quarters and tenths and hundredths as percentages.		
D.6.8	find simple percentages of small whole-number quantities.		
D.6.9	understand the relationship between fractions, decimals and percentages.		

E: MASS (WEIGHT)

Weight is a quantity. Measuring and understanding weight is of utmost importance. Undoubtedly, you have experienced the measurement of weight many times, such as at the time of physical health check-ups. Or perhaps you may have asked yourself: Is that object too heavy to pick up by myself or do I need something to lift it?

When you go to the greengrocer to buy vegetables and fruit, for example, there will be tags attached that tell you the price per kilogram so you can compare the cost of one brand/item over another. Without a standard measure of weight, in this case a kilogram, you wouldn't know exactly what you are paying for.

Unlike other quantities, it is very difficult to measure weight in a visible way like length and size. Weight is difficult to judge visually. While you can always make an estimate of the weight of an object, you will need to use a measuring tool such as a measuring tape, a ruler or a trundle wheel to have an accurate measure in grams and/or kilograms. In order to do this, you need to be able to read a scale.

The above are only a few life situations where being able to read, measure and understand weight is important. Helping our children understand and appreciate this may be fruitful.

Note: The terms mass and weight are different, yet are used interchangeably throughout the Primary years.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
E.6.1	use, read and write standard metric units, including their abbreviations, and relationships between them.	weight gram (g) kilogram (kg) balance heavy / heavier light / lighter scales convert difference compare	• choosing an appropriate unit of measurement and measuring equipment to make a reasonable estimate and measure mass (weight). • recording estimates and readings from scales to a suitable degree of accuracy. • practising weighing and estimating the mass (weight) of familiar objects and developing their own benchmark for comparisons, for example, having a 1 kg weight or an object that weighs a certain amount as a reference. • feeling real supermarket products with their weights hidden, estimating their weights and putting them in order from lightest to heaviest, then checking their actual weight using a balance. • converting a collection of mass (weight) labels shown on real products or in recipes from kilograms to grams and from grams to kilograms, and from fraction or decimal number to kilograms and grams and vice versa.
E.6.2	convert larger to smaller units and vice versa.		

			• using the bathroom scales to measure their own mass (weight) and comparing their mass (weight) to other objects or persons. • solve real-life problems (inc. multi-step) related to the topic mass (weight) such as involving recipes, travelling by plane, at the supermarket, … and then communicating the process adopted and/or their result/s. • investigating mathematical problems and then communicating the process adopted and/or their result/s. • creating word problems related to mass (weight).

F: CAPACITY

Understanding capacity is especially important in the field of medicine or chemistry when one is dealing constantly with liquid measurement. Nonetheless, understanding capacity is also important in our everyday life.

When you are sick and your doctor prescribes medicine you need to take your medicine in the proper amounts. Your health will not benefit if you take too little or too much. Cooking also involves a lot of measurement such as: add 120 mℓ of water or 50 mℓ of olive oil. In fact, the kitchen is a good place, though not the only, to measure different capacities. Using a measuring jug you can check the capacity of different items such as cups, glasses, bottles and perhaps the capacity of a kettle. What is the capacity of the milk carton in your fridge? And do you have anything in your kitchen, in the cupboards or in the fridge, which has a capacity of 1 litre? Estimate and then check by reading the label on the container/s.

The above are only a few life situations where being able to read, measure and understand capacity is important. Helping our children understand and appreciate this may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
F.5.1	use (measure and estimate), read and write standard metric units, including their abbreviations, (*mℓ* and *ℓ*), and relationships between them (by converting from larger to smaller units and vice versa) in order to refer to capacity.	estimate measure litres millilitres scale capacity divisions smaller larger equal to more / the most less / the least convert	• suggesting suitable units and measuring equipment to estimate or measure capacity. • recording estimates and readings from scales to a suitable degree of accuracy. • estimating the capacity of a number of products from real-life, then checking their capacity label or measuring their capacity using a measuring jug. Children can put the products in order from smallest to largest. • estimating how many smaller containers are needed to fill a larger container and vice versa. • observing and comparing products having different capacities when shopping, such as at the supermarket, etc. Identifying the labels showing the capacity and comparing the prices to see how much money can be saved (if any) when buying products with larger capacities rather than two smaller products. • solving various real-life problems (inc. multi-step) related to capacity through reasoning and practical work and communicating the process adopted and/or their result/s. • investigating mathematical problems and communicating the process adopted and/or their result/s. • creating word problems related to capacity.
F.5.2	measure and draw lines on scales to the nearest millimetre.		

G: LENGTH, PERIMETER AND AREA

Learning how to measure length is an important life skill. Measurements in millimetres, centimetres, metres and kilometres are also very much present in sports and not only. Sometimes, measurements need to be accurate, however many times we simply need to make estimates.

Measuring length is also essential for calculating perimeter and area: two important and fundamental mathematical topics. They help you to measure physical space. Perimeter is a measurement of the distance around a shape and the area gives us an idea of how much surface the shape covers. Knowledge of perimeter and area is applied practically by people on a daily basis, such as architects, engineers, and graphic designers… it is mathematics that is very much needed by people in general. Understanding how much space you have and learning how to fit shapes together exactly will help you when you paint a room, buy a home, remodel a kitchen or build a deck.

The above are only a few life situations where being able to read, measure, calculate and understand length, perimeter and area is important. Helping our children understand and appreciate this may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
G.6.1	use, read and write standard metric units, including their abbreviations, and explore the relationships between them.	millimetre (mm) centimetre (cm) metre (m) kilometre (km) approximately equal to area square centimetre (cm^2) length times breadth (l × b) perimeter rectangle/square	• understanding metric units. • converting larger to smaller units e.g km to m, m to cm or mm. • converting smaller to larger units e.g. m to km, cm or mm to m. • measuring and drawing lines to the nearest millimetre. • recording estimates and readings from scales to a suitable degree of accuracy. • understanding area measured in square centimetres. • solving word problems (inc. multi-step) and communicating the process adopted and/or their result/s. • investigating mathematical problems and communicating the process adopted and/or their result/s. • creating word problems related to length, perimeter and/or area.
G.6.2	suggest suitable units and measuring equipment to estimate or measure length.		
G.6.3	understand and use the formula in words length x breadth for the area of a rectangle.		
G.6.4	calculate the area of compound shapes that can be split into rectangles.		
G.6.5	understand, measure and calculate perimeters of rectangles and regular polygons.		
G.6.6	work out the area of a right angled triangle by considering it as half a rectangle.		

H: TIME

Being able to tell time is a functional mathematical skill. Being punctual is important: whether at school or whether you are meeting your friends. When you grow up you would want to be punctual at work too. Moreover, being able to tell time will help you catch a bus or a flight on time. Usually it is suggested to be at the airport two hours before the departure of our flight. On the other hand if you park your car in a 150 minute parking space, you will need to be careful not to get a ticket.

Being able to tell time will further help you not to miss your favourite television programme. And what if you are baking a cake and on the recipe it says that bake time is 45 minutes, you would want to know how to keep the time on your analogue watch or on the digital time display on your oven. Likewise, if your favourite football team is winning 2 – 1, you would want to be able to know how many minutes are left to end of the match. And in order to remember to prepare a birthday card for your best friend you need to be able to read a calendar.

The above are only a few life situations when being able to tell time is important. Helping our children understand and appreciate this may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
H.6.1	use and compare units of time.	seconds minutes hours use of abbreviations **h** and **min** days weeks months year leap year calendar past to half past quarter past quarter to o'clock a.m. p.m. How long….? Duration	• using an analogue and a digital clock. • connecting time to real life events. • drawing hands on the clock face to show time (using a ruler). • measuring time in hours, minutes and seconds. • converting from: ⊕ hours to minutes, and vice versa. ⊕ hours and minutes to minutes, and vice versa (include use of fractions to represent to minutes e.g. 2 ½ hour). ⊕ minutes to seconds, and vice versa. ⊕ days to weeks, and vice versa. ⊕ months to days, and vice versa. • using a timetable (include: the use of real timetables). • using a timeline. • calculating and comparing durations of events. • calculating the starting time and/or the finishing time. • calculating the time a number of hours and /minutes earlier/later than a given time. • solving word problems (inc. multi-step) and communicating the process adopted and/or their result/s. • investigating mathematical problems and communicating the process adopted and/or their result/s. • creating word problems related to time.
H.6.2	read the time on a 24-hour digital clock and use 24-hour clock		
H.6.3	convert time between analogue and digital 12- and 24-hour clocks.		
H.6.4	work out the duration of a time interval.		
H.6.5	use a calendar.		

I: MONEY

Being able to compare offers, read and understand receipts and pay bills at the supermarket, at a restaurant or at our favourite toy shop is very important. Then, you would want to make sure that you have received the correct change if you pay by cash and you do not have the exact amount. However, when you grow older you can also pay by cheque or card.

Equally important is being able to make plans related to money. This is what we refer to as budgeting. If you are saving to buy something special, you would want to be able to calculate how much more you need to save and also to know how long it will take you to save up for it.

If you or someone within your family have saved up to go on a family holiday, make sure to check the currency used in the country you are travelling to. The euro is the currency used in 18 of the 28 member states of the European Union.

The above are only a few life situations when being financially literate is important. Helping our children understand and appreciate this may be fruitful.

Note: use the words **euro** and **cent** as both singular and plural

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
I.6.1	work out totals up to €10,000 (ten thousand euro) and more.	coin/s notes cent (c) euro (€) how much? cost/s price total change	• handling money in real life contexts such as helping with outing money collections and school fund raising activities. • planning an activity such as a party, a meal or an outing with a given budget. • planning a shopping list with a given budget using estimation and rounding. • integrating this topic with weight and capacity as they calculate the cost of certain ingredients of a recipe. • reading information from a conversion graph (between different currencies). • calculating and discussing whether certain special offers are really worthwhile opting for. • playing board games involving the handling of money. • using junk mail, menus, price list, receipts and shop loyalty cards to investigate and solve situations involving money. • using tickets, travel brochures and any of the above to plan and budget for family or school trips. • solving word problems (inc. multi-step) involving money and communicate their result/s and/or the process adopted. • investigating word problems relating to money and communicating the process adopted and/or their result/s. • creating word problems related to money.
I.6.2	give change.		
I.6.3	work out which notes and coins are needed to pay.		
I.6.4	convert euro to cent and vice versa.		

J: SHAPES AND SYMMETRY

There is evidence of geometry everywhere. Buildings, planes, cars and maps all use geometry. For example, the home you live in is made of basic geometry shapes and some skyscrapers have windows made of rectangles and squares. Very often these structures are also symmetrical.

Symmetry can be seen almost everywhere in daily life. The human body is an example of symmetry: the kidney, the lungs the brain and to some extent even the face is.

Being able to understand the basic properties of 2-D and 3-D shapes, to draw shapes and to create your own patterns, whether symmetrical or not, will help you appreciate better the world we live in and will probably help you in your future career should you wish to become an engineer, a doctor, a scientist, a designer or a mechanic. However there are many other occupations that entail competence in geometry.

The above are only a few life situations where understanding of shapes and symmetry is important. Helping our children understand and appreciate this may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
J.6.1	classify triangles using criteria.	reflective symmetry line of symmetry polygons regular irregular two-dimensional three-dimensional pentagon, hexagon, octagon straight side vertex / vertices edges faces base nets equilateral, isosceles, scalene right-angled triangle horizontal, vertical diagonal fold line	• stating the properties of different triangles, namely the equilateral, isosceles, and scalene triangles, by referring to the length of sides, their angles and lines of symmetry. • identifying the lines of symmetry of a given polygon using shape templates and folding. • working in groups and use technological equipment such as probots to create various polygons by giving a series of instructions. • exploring that regular polygons have the same number of lines of symmetry as the number of sides and the number of vertices. • extend the understanding of regular polygons by observing polygons in real life and finding their lines of symmetry. • using squared paper to complete the reflection of a polygon on the other side of a mirror line. • exploring polygons and symmetrical patterns using polygons during interactive onscreen activities. • describing polygons by referring to the sides, e.g. horizontal or vertical. • participating in investigational maths activities that require problem-solving and allow for further exploration of 2-D (flat) and 3-D (solid) shapes.
J.6.2	visualise 3-D shapes from 2-D drawings and identify different		
J.6.3	recognise reflective symmetry in regular polygons, and recognise		
J.6.4	complete symmetrical patterns with two lines of symmetry at right angles.		

K: Position, Direction and Angles

Being able to read a map to follow and/or give directions are functional skills. Distinguishing between left and right, between clockwise and anticlockwise turns and among the eight compass points will equip you with these skills. A pilot, a sailor, a fisherman, a policeman… and any driver need to have a good grasp of these skills. Furthermore engineers, architects, product designers use knowledge of angles daily.

The above are only some instances where position, direction and angles are important. Helping our children understand and appreciate these through their own experiences may be fruitful.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
K.6.1	understand the eight compass- point directions.	angle/right angle degrees (°) direction/direction compass north/south/west/east north-east/north-west south-east/south-west halfway turn half turn quarter turn clockwise/anticlockwise grid/grid line protractor zero line centre scale acute/ob tuse	• reinforcing the use of a compass. • constructing a wind vane, understanding the parts of a wind vane, understanding that wind vanes are used to measure wind direction and telling the wind direction from their own wind vane. • using the language of direction to guide a partner through a maze or to a place. • using a map (e.g. describe points in relation to one another using the four-point compass). • following and giving instructions involving distances by interpreting simple scales. • using Pro-bot and/or Constructa-bot or other roamers to programme commands/instructions to draw shapes/graphics to practice angles, directions and movement. • calculating one angle of a triangle, given the other two. • calculating a missing angle around a point, given the other/s. • using a protractor.
K.6.2	use angle measure in degrees		
K.6.3	identify, estimate and order acute and obtuse angles.		
K.6.4	estimate, measure and draw angles (acute and obtuse) in degrees to the nearest 5^0 using a protractor.		
K.6.5	understand that: • the sum of the angles of a triangle is 180°. • the angles on a straight line add up to 180°. • the angles around a point add up to 360°.		

L: Data Handling

Data handling is an essential activities in which we engage in our everyday life. We are frequently presented with data in various contexts which we need to analyse and interpret. Data can be presented in a variety of forms such as bar charts or pictograms. We often look for patterns and generalities within them and analysis is often confined to identifying the most popular or least popular item. However, we need to engage in more critical thinking. For example, drawing on real data in 2014 NSO has reported that from 2004 to 2013, both rainfall intensity and variability of total rainfall from the climatic norm were the lowest in the past four decades. And in the End of Primary Benchmark, in mathematics, the mean score was 69·20. We can attempt to look deeper into this data.

The above are only two instances of data analysis. Helping our children understand and appreciate data handling through their own experiences may be fruitful.

Note: At Primary level mean and average are used interchangeably.

YEAR 6

LEARNING OUTCOMES Children will be able to:		KEY VOCABULARY	OPPORTUNITIES Children should be given a range of opportunities such as:
L.6.1	solve a problem by representing and interpreting data in tables, charts, graphs and diagrams.	sort label list table pictograph block graph frequency frequency table total pictograph title key most/least popular axis/axes horizontal/vertical average/mean Carroll Diagram	• constructing and interpreting bar-line graphs (vertical axis labelled in 2s, 5s, 10s, 20s or 100). • completing or filling in a Carroll Diagram. • constructing line graph. • interpreting line graphs e.g.: distance/time; a multiplication table, a conversion graph, a graph of pairs of numbers adding to 8.
L.6.2	solve a problem by representing, extracting and interpreting data in tables, graphs and charts,		
L.6.3	work out the mean (commonly known as 'average') of a set of data.		